

**Amendments to the Specification:**

Please amend the specification as follows:

Page 3, paragraph [0008], please replace with the following paragraph:

[0008] To solve the above problems and to achieve the objects, ~~according to the invention of claim 1~~ according to an aspect of the present invention, a similar-pattern searching apparatus for searching a pattern having a high similarity to a pattern of a test sample from a group including a plurality of patterns includes a storage unit that stores a class map generated by selecting model parameters that characterize a plurality of component fractions included in each of the patterns, and by clustering the patterns; and a similar-pattern searching unit that selects a class similar to a component fraction included in the pattern of the test sample from the class map.

Page 3, paragraph [0009], please replace with the following paragraph:

[0009] ~~According to the invention of claim 1~~ According to the above aspect, a plurality of patterns are clustered to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. The class similar to the component fraction included in the pattern of the test sample is selected from the class map, and subjected to a highly accurate similar search.

Page 4, paragraph [0010], please replace with the following paragraph:

[0010] ~~According to the invention of claim 2~~ According to another aspect of the present invention, the patterns are one-dimensional or multi-dimensional patterns. ~~According to the invention of claim 2 aspect~~, the one-dimensional or multi-dimensional patterns are subjected to the highly accurate similarity search.

Page 4, paragraph [0011], please replace with the following paragraph:

[0011] ~~According to the invention of claim 3~~ According to still another aspect of the present invention, the patterns are leukocyte particle size patterns, protein electrophoretic waveforms, or blood cell histograms. ~~According to the invention of claim 3~~ According to the aspect, the leukocyte particle size patterns, the protein electrophoretic waveforms, or the blood cell histograms are subjected to the highly accurate similarity search.

Page 4, paragraph [0012], please replace with the following paragraph:

[0012] ~~According to the invention of claim 4~~ According to still another aspect of the present invention, a similar-pattern searching method of searching a pattern having a high similarity to a pattern of a test sample from a group including a plurality of patterns includes a class-map generating step of selecting model parameters that characterize a plurality of component fractions included in each of the patterns, clustering the patterns, and generating a class map; a storage step of storing the class map generated at the class-map generating step; and a similar-pattern searching step of selecting a class similar to a component fraction included in the pattern of the test sample from the class map.

Page 4, paragraph [0013], please replace with the following paragraph:

[0013] ~~According to the invention of claim 4~~ According to the above aspect, a plurality of patterns are clustered to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. The class similar to the component fraction included in the pattern of the test sample is selected from the class map, and subjected to a highly accurate similar search.

Page 5, paragraph [0014], please replace with the following paragraph:

[0014] ~~According to the invention of claim 5~~ According to still another aspect of the present invention, a similar-pattern search program that realizes on a computer a similar-pattern searching method of searching a pattern having a high similarity to a pattern of a test sample

from a group including a plurality of patterns, causes the computer to execute a class-map generating process of selecting model parameters that characterize a plurality of component fractions included in each of the patterns, clustering the patterns, and generating a class map; a storage process of storing the class map generated at the class-map generating process; and a similar pattern search step of selecting a class similar to a component fraction included in the pattern of the test sample from the class map.

Page 5, paragraph [0015], please replace with the following paragraph:

[0015] ~~According to the invention of claim 5~~ According to the above aspect, a plurality of patterns are clustered to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. The class similar to the component fraction included in the pattern of the test sample is selected from the class map, and subjected to a highly accurate similar search.

Page 5, paragraph [0016], please replace with the following paragraph:

[0016] ~~According to the invention of claim 6~~ According to still another aspect of the present invention, a similar-pattern searching apparatus for searching a leukocyte particle size pattern having a high similarity to a leukocyte particle size pattern of a test sample from a group including a plurality of leukocyte particle size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions includes a primary clustering unit that clusters the leukocyte particle size patterns obtained by a measurement while applying a self-organizing map to the leukocyte particle size patterns, and that generates a primary class map; a first-parameter determining unit that executes an EM algorithm for the respective leukocyte particle size patterns included in the primary class map using predetermined initial values, thereby determining first-mixture-distribution model parameters including the number of cellular components contained in each of the patterns, and an average, a variance, and a density of each of the cellular components; a second-parameter determining unit that executes the EM algorithm for the respective leukocyte particle size patterns using the first-mixture-distribution model parameters as the initial values, thereby

determining second mixture distribution model parameters including the number of the cellular components contained in each of the leukocyte particle size patterns, and the average, the variance, and the density of each cellular component; a secondary clustering unit that clusters the respective leukocyte particle size patterns while applying the self-organizing map to the first mixture distribution model parameters, and that generates a secondary class map; an inter-class distance master generator that calculates similarity distances between all combinations of respective classes included in the secondary class map, and that generates an inter-class distance master in which the combinations of the classes correspond to the respective inter-class similarity distances; a storage unit that stores the secondary class map and the inter-class distance master; a class determining unit that determines a class belonging to each of cellular component fractions included in the leukocyte particle size pattern of the test sample from the secondary class map; and a similar-pattern searching unit that detects, as a similar class, a class which similarity distance from the class determined by the class determining unit is equal to or smaller than a predetermined threshold, from the inter-class distance master, and that determines a leukocyte particle size pattern included in the similar class as the pattern having the high similarity to the leukocyte particle size pattern of the test sample.

Page 7, paragraph [0017], please replace with the following paragraph:

[0017] ~~According to the invention of claim 6~~ According to the above aspect, the respective components included in each of the leukocyte particle sizes are separated by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the leukocyte particle size patterns are clustered again using the self-organizing map. The secondary class map and the inter-class distance master are thereby constructed.

Page 7, paragraph [0018], please replace with the following paragraph:

[0018] ~~According to the invention of claim 7~~ According to still another aspect of the present invention, a similar-pattern searching method of searching a leukocyte particle size pattern

having a high similarity to a leukocyte particle size pattern of a test sample from a group including a plurality of leukocyte particle size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions includes a primary clustering step of clustering the leukocyte particle size patterns obtained by a measurement while applying a self-organizing map to the leukocyte particle size patterns, and generating a primary class map; a first-parameter determining step of executing an EM algorithm for the respective leukocyte particle size patterns included in the primary class map using predetermined initial values, thereby determining first-mixture-distribution model parameters including the number of cellular components contained in each of the patterns, and an average, a variance, and a density of each of the cellular components; a second-parameter determining step of executing the EM algorithm for the respective leukocyte particle size patterns using the first-mixture-distribution model parameters as the initial values, thereby determining second mixture distribution model parameters including the number of the cellular components contained in each of the leukocyte particle size patterns, and the average, the variance, and the density of each cellular component; a secondary clustering step of clustering the respective leukocyte particle size patterns while applying the self-organizing map to the first mixture distribution model parameters, and generating a secondary class map; an inter-class distance master generating step of calculating similarity distances between all combinations of respective classes included in the secondary class map, and generating an inter-class distance master in which the combinations of the classes correspond to the respective inter-class similarity distances; a storing step of storing the secondary class map and the inter-class distance master; a class determining step of determining a class belonging to each of cellular component fractions included in the leukocyte particle size pattern of the test sample from the secondary class map; and a similar-pattern searching step of detecting, as a similar class, a class which similarity distance from the class determined at the class determining step is equal to or smaller than a predetermined threshold, from the inter-class distance master, and determining a leukocyte particle size pattern included in the similar class as the pattern having the high similarity to the leukocyte particle size pattern of the test sample.

Page 8, paragraph [0019], please replace with the following paragraph:

[0019] ~~According to the invention of claim 7~~ According to the above aspect, the respective components included in each of the leukocyte particle sizes are separated by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the leukocyte particle size patterns are clustered again using the self-organizing map. The secondary class map and the inter-class distance master are thereby constructed.

Page 9, paragraph [0020], please replace with the following paragraph:

[0020] ~~According to the invention of claim 8~~ According to still another aspect of the present invention, a similar-pattern search program that realizes on a computer a similar-pattern searching method of searching a leukocyte particle size pattern having a high similarity to a leukocyte particle size pattern of a test sample from a group including a plurality of leukocyte particle size patterns, each of the leukocyte particle size patterns including a plurality of cellular component fractions, causes the computer to execute a primary clustering process of clustering the leukocyte particle size patterns obtained by a measurement while applying a self-organizing map to the leukocyte particle size patterns, and generating a primary class map; a first-parameter determining process of executing an EM algorithm for the respective leukocyte particle size patterns included in the primary class map using predetermined initial values, thereby determining first-mixture-distribution model parameters including the number of cellular components contained in each of the patterns, and an average, a variance, and a density of each of the cellular components; a second-parameter determining process of executing the EM algorithm for the respective leukocyte particle size patterns using the first-mixture-distribution model parameters as the initial values, thereby determining second mixture distribution model parameters including the number of the cellular components contained in each of the leukocyte particle size patterns, and the average, the variance, and the density of each cellular component; a secondary clustering process of clustering the respective leukocyte particle size patterns while applying the self-organizing map to the first mixture distribution model parameters, and generating a secondary class map; an inter-class distance master generating process of calculating similarity distances between all combinations of

respective classes included in the secondary class map, and generating an inter-class distance master in which the combinations of the classes correspond to the respective inter-class similarity distances; a storing process of storing the secondary class map and the inter-class distance master; a class determining process of determining a class belonging to each of cellular component fractions included in the leukocyte particle size pattern of the test sample from the secondary class map; and a similar-pattern searching process of detecting, as a similar class, a class which similarity distance from the class determined at the class determining process is equal to or smaller than a predetermined threshold, from the inter-class distance master, and determining a leukocyte particle size pattern included in the similar class as the pattern having the high similarity to the leukocyte particle size pattern of the test sample.

Page 10, paragraph [0021], please replace with the following paragraph:

[0021] ~~According to the invention of claim 8~~ According to the above aspect, the respective components included in each of the leukocyte particle sizes are separated by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the leukocyte particle size patterns are clustered again using the self-organizing map. The secondary class map and the inter-class distance master are thereby constructed.

Page 10, paragraph [0022], please replace with the following paragraph:

[0022] ~~According to the invention of claim 9~~ According to still another aspect of the present invention, a cellular-component-fraction separating apparatus for separating a plurality of cellular component fractions included in a leukocyte particle size pattern includes a primary clustering unit that clusters a plurality of leukocyte particle size patterns, which are obtained by measurement, while applying a self-organizing map to the leukocyte particle size patterns, and that generates a primary class map; a parameter determining unit that executes an EM algorithm for the respective leukocyte particle size patterns included in the primary class map using predetermined initial values, thereby determining mixture distribution model

parameters including the number of cellular components contained in each of the patterns, and an average, a variance, and a density of each of the cellular component fractions; and a fraction separating unit that executes the EM algorithm for the respective leukocyte particle size patterns using the mixture distribution model parameters as the initial values, thereby separating the cellular component fractions included in each of the leukocyte particle size patterns.

Page 11, paragraph [0023], please replace with the following paragraph:

[0023] ~~According to the invention of claim 9~~ According to the above aspect, self-organizing map (SOM) is applied to determine the initial values of the EM algorithm.

Page 11, paragraph [0024], please replace with the following paragraph:

[0024] The similar-pattern searching apparatus according to ~~the present invention (claim 1)~~ one aspect clusters a plurality of patterns to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. In addition, the apparatus selects the class similar to the component fraction included in the pattern of the test sample from the class map. It is, therefore, advantageously possible to highly accurately search a pattern having a high similarity to the pattern of the test sample from the group including a plurality of patterns. In addition, it is advantageously possible to provide information useful for a diagnosis.

Page 12, paragraph [0025], please replace with the following paragraph:

[0025] The similar-pattern searching apparatus according to ~~the present invention (claim 2)~~ another aspect uses the one-dimensional or multi-dimensional patterns as the patterns. It is, therefore, advantageously possible to highly accurately search a pattern having a high similarity to the one-dimensional or multi-dimensional pattern of the test sample.



Page 12, paragraph [0026], please replace with the following paragraph:

[0026] The similar-pattern searching apparatus according to ~~the present invention (claim 3)~~ still another aspect uses the leukocyte particle size patterns, the protein electrophoretic waveforms, or the blood cell histograms as the patterns. It is, therefore, advantageously possible to highly accurately search a pattern having a high similarity to the leukocyte particle size pattern or a pattern of the protein electrophoretic waveforms or the blood cell histograms.

Page 12, paragraph [0027], please replace with the following paragraph:

[0027] With the similar-pattern searching method according to ~~the present invention (claim 4)~~ still another aspect a plurality of patterns are clustered to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. In addition, the class similar to the component fraction included in the pattern of the test sample is selected from the class map. It is, therefore, advantageously possible to highly accurately search a pattern having a high similarity to the pattern of the test sample from the group including a plurality of patterns. In addition, it is advantageously possible to provide information useful for a diagnosis.

Page 12, paragraph [0028], please replace with the following paragraph:

[0028] The similar-pattern search program according to ~~the present invention (claim 5)~~ still another aspect clusters a plurality of patterns to generate the class map using the model parameters that characterize a plurality of component fractions included in each of the patterns. In addition, the similar-pattern search program selects the class similar to the component fraction included in the pattern of the test sample from the class map. It is, therefore, advantageously possible to highly accurately search a pattern having a high similarity to the pattern of the test sample from the group including a plurality of patterns. In addition, it is advantageously possible to provide information useful for a diagnosis.

Page 13, paragraph [0029], please replace with the following paragraph:

[0029] The similar-pattern searching apparatus according to ~~the present invention (claim 6)~~ still another aspect separates the respective components included in each of the leukocyte particle sizes by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the apparatus clusters again the leukocyte particle size patterns using the self-organizing map. The apparatus thereby constructs the secondary class map and the inter-class distance master. It is, therefore, advantageously possible to arbitrarily select the similarities of the search target.

Page 13, paragraph [0031], please replace with the following paragraph:

[0031] With the similar-pattern searching method according to ~~the present invention (claim 7)~~ still another aspect, the respective components included in each of the leukocyte particle sizes are separated by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the leukocyte particle size patterns are clustered again using the self-organizing map. The secondary class map and the inter-class distance master are thereby constructed. It is, therefore, advantageously possible to arbitrarily select the similarities of the search target.

Page 14, paragraph [0032], please replace with the following paragraph:

[0032] The similar-pattern search program according to ~~the present invention (claim 8)~~ still another aspect separates the respective components included in each of the leukocyte particle sizes by the EM algorithm using the initial values determined by using the self-organizing map. In addition, the similar-pattern search program clusters again the leukocyte particle size patterns using the self-organizing map. The similar-pattern search program thereby constructs the secondary class map and the inter-class distance master. It is, therefore, advantageously possible to arbitrarily select the similarities of the search target.

Page 14, paragraph [0033], please replace with the following paragraph:

[0033] The fraction separating apparatus according to ~~the present invention (claim 9)~~ still another aspect applies the self-organizing map (SOM) to determination of the initial values of the EM algorithm. It is, therefore, advantageously possible to solve the problem of convergence of the marginal likelihood on the local maximum.

Page 20, paragraph [0052], please replace with the following paragraph:

[0052] ~~An external input and output apparatus 2~~ An external input and output apparatus 3 transmits user-input parameters, similar pattern search conditions and the like input to the similar-pattern searching apparatus 1. In addition, the external input and output apparatus 3 outputs the similar patterns hit in the similar-pattern searching apparatus 1 on a screen.